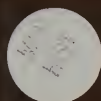


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ART OF PROLONGING LIFE

1839

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THE
ART OF PROLONGING LIFE
BRIEFLY CONSIDERED.

A LECTURE,

DELIVERED BEFORE THE ATHENIAN INSTITUTE,

JANUARY, 1839.

BY J. PANCOAST, M. D.

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TO N. CHAPMAN, M. D.

MY DEAR SIR :

Having been called on to furnish for publication a copy of a Lecture delivered before the Athenian Institute in January last, I have, in complying with the request, thought I perceived a peculiar fitness in inscribing it to you, whose energies have been devoted by public instruction of the most extensive kind, as well as by the private practice of your profession, to the noble aim of lengthening the tenure and assuaging the miseries of human existence.

The subject I have chosen, is perhaps better fitted for closet study, than for popular display, embracing as it does, so comprehensive a scope, and so many of the mysteries of medical and moral science.—I am well assured, however, from my knowledge of the native kindliness of your disposition, and your generous wishes for the spread of science, that no one more than yourself will look with favour upon this attempt at a brief portraiture of the “Art of Prolonging Life,” on the part of one whose admiration of you as his teacher has been heightened into affection, by his knowledge of your value as a friend.

J. PANCOAST.

THE

ART OF PROLONGING LIFE.

In whatever direction we survey our Globe, we find every where, except at the immediate region of the poles, the Air, the Earth, the Water, animated with life. The structure of the planet upon which this vast expanse of living things is spread, is inorganic, indestructible and unchangeable, save as it may be modified by the internal agency of subterranean fire or the laws of chemical attraction. Its formation was at the origin of things, and its duration must be throughout all time. Its whole mass has been shown, by the researches of the chemist and geologist, to be composed of but a few elements, variously combined, and constituting a number of inorganic atoms, which are bound together under peculiar laws and attractions. The study of these atoms or particles, simple and unimportant as they appear, has led to the determination of laws, which the astronomer has been enabled to apply with prophetic skill to the movements of the celestial bodies: and from the unfailing accuracy with which his

predictions have been verified, we are convinced that the powers which control the planets in their orbits, are the same as those which unite the individual atoms of the earth together or move them in masses; and that without the study of these atoms, we could never have discovered or been capable of comprehending the mechanics of the heavens.

Thus is it in regard to human life: a subject far more incomprehensible in itself, than that of the planetary movements; a subject that we can only comprehend by induction and comparison; and therefore we must in a similar manner commence our investigations with the humblest thing that lives—where life forms the simplest problem, and trace it up through its various developments in the scale of animals.

How animated is the scene which nature presents to view, through her myriads of organised beings!—Among them what endless variety of form, what diversity of endowment!—From the insect millions that people the air, to the eagle and the condor—from the animals that dwell in the cells of the coral and the sponge, to the huge leviathan of the deep; and from the humblest creeping insect up to man, “lord of the lion heart and eagle eye, half angel and half brute,” all manifest life and motion and change; require a supply of nourishment from without, grow old and die, and exist only under the influence of a common principle which we call life. The chemical constituents of which they are all composed, as oxygen, hydrogen, nitrogen and carbon, are the same as those which constitute the lifeless masses of the earth.

What then is this mighty talisman, this principle called life, at whose inspiring touch the crude elements of nature

start into combination, and take on the form and actions of living things? Is its nature within the grasp of human reason? In the investigation of inorganic substances, we find many subjects presented to view, as electricity and magnetism, the use of which we may control, but whose essence or source we cannot comprehend. In our first attempts to analyse them, their nature appears clear to the most ordinary comprehension; as we pursue the analysis farther, the finest intellect becomes bewildered in the mazes of first causes; and at length the road of investigation is wholly closed to our finite organs, as if the distant vista was closed by an impenetrable curtain, from which the rays of reason are reflected back, scattered and obscured. Yet the knowledge of them that we do possess is adequate to all our wants. One we have converted into a guide to lead us over the trackless bosom of the ocean—the other, subservient to our wishes, may be made to light up at command the lamp by our bed side.

So in regard to the principle of life,—that ethereal essence, which gives action to the heart and sensation to the brain,—we can know nothing in the abstract, but are enabled to study it like electricity and magnetism only in its manifestations. But we may, as the ultimate point to which we can trace life, consider it with a distinguished German philosopher, as a breathing of the divinity, a power conferred by the supreme Architect of all, upon the particles of which every living body is composed. In the expressive language of scripture, “God formed man of the dust of the ground, and blew into his nostrils the breath of life, and he became a *living* soul.” Life, as

it appears to us, or rather the phenomena of which it consists, is a mere result of the action of living bodies, and must consequently vary in different beings in proportion to the number of organs or parts of which they are composed. What a diversified picture is presented before us, when we take a comprehensive glance at the whole scheme of vegetable and animal existence !

How simple does life appear, consisting as it were of a single shade in the vegetable kingdom,— or in the zoophyte or plant animal, which is fixed in one spot without the power of locomotion, and whose only function consists in that of absorbing and exuding fluids—a mere living sponge ! Ascending from this zero point of the scale, we find animal rising over animal in regular progression, with organ after organ superadded, endowing them with the power of locomotion, and with instincts and senses for self preservation. —Till finally, in that perfection of creation, the human form, are found summed up all the parts which have been parceled out in the gradation of animals, with an intellect crowning them all, capable of mounting over the confines of the earth, guiding and controlling the whole. What a play of phenomena are presented to the view of the physiologist, as the hundred different organs of which the human frame is composed, act and react upon each other ; how the colours in the picture thicken, numberless and ever varying, yet always beautiful, like the witchery of the kaleidoscope, and which continue to charm the eye till disease or old age have sapped the springs of life.

The general elements which surround our globe, as light,

heat, air, and water, are indispensable to vital existence ; more immediately so even than the grosser aliments of our tables. From their presence all the enjoyments of life flow ; deprived of them every living thing would die ; this world would be one vast charnel house. The vegetable kingdom exists also only under the influence of these agents. There life may be seen in its simplest state,—causing the seed to germinate into a plant under the influence of heat and moisture—enabling the plant to draw up the fluids of the soil by a sort of vital suction—and thus to raise the sprout into a twig, convert it into a tree, and cover it with foliage, with flowers and with fruits. Deprive a vegetable of the light of day—and if afterwards but a crevice be opened, through which some rays should reach it, it will turn itself in that direction. But however assiduously we cherish it, we shall find, if kept secluded, its colours faded, and its leaves withered. Rob it of heat—as naturally takes place in the advance of autumn—and see how its bloom, its beauties, all decay. Dry up the moisture of the soil in which its roots expand,—no longer can it receive the nourishment that the water retains in solution, and which thus constitutes the only vehicle of its support and growth ;—the plant or the tree suffers and dies. Thus simple, thus easily influenced is life in plants.

In the domains of animated nature there are gradations or terraces as it were, more varied than in those of the vegetable kingdom ; on the highest and most commanding of these is placed man in the plenitude of all animal perfection. For there are clefts in the rocks, depths in the waters, obscurities in the woods, and mansions in the air, where the complicated

structure of man would not allow him to dwell ; and had all animals been constructed after his model, how large a portion of the earth's surface would have been without inhabitants. Admirably has this been provided against, by the creation of numberless living beings, all linked one to another in a downward grade from man, till the scale terminates in a point where we can no longer distinguish the animal from the plant—yet each being with its round of wants and enjoyments as completely fitted to the orbit in which it moves as man. What harmonious grandeur does the scheme of creation thus exhibit ! which, while it displays the beneficence of the Creator, (for life in the meanest thing that crawls or swims appears to be attended with enjoyment,) brightens up the face of nature and heightens the interest of man's own existence, whether it be in the mere relaxation of a summer morning's ramble in the country, or in the higher and more infatuating studies of natural science.

The animal kingdom, in order to show the influence of these elements upon it, may be considered as divided into two great classes. The cold and the warm blooded. The cold blooded division, consisting of worms, fishes and reptiles, have their blood or nutritious juices, like vegetables, of a temperature but little above that of the air or water in which they live ; yet these animals require the influence of the sun's rays to reach the utmost perfection of function of which their simple organisation is susceptible, and which appears to be to them a rich source of animal gratification, when basking in the sunshine at the surface of the water, or sunning themselves upon the mountain side.

To the warm blooded animals, consisting of birds, quadrupeds, and man, light not only affords the necessary means for the procurement of food, but also imbues them with a subtle, cheering, electrical influence, necessary to a healthful action of the body.

The influence which light may exercise in the growth and development of children, may be inferred from its extraordinary effects proved by many well attested experiments on the batrachia or frog tribe. These animals in the earlier part of their existence have the form of fishes—live only in the water, and breathe but the limited portion of air which the water contains, by means of gills. In process of time, if the animal be exposed to the sun's rays, lungs are developed in the place of gills, to fit it to breathe the upper air, its tail drops off, its limbs shoot forth, and we have the amphibious frog. But, if the animal in its first, or fish-like state, is kept where no light can reach it, it grows in dimensions, but is not changed in form; it remains a fish. The influence of the common blessing of the solar rays on man may readily be inferred, when we observe the pallid features and debilitated frames of those who have been confined in gloomy dungeons, or kept secluded in the precincts of the chamber, the study, or the counting room.

Heat is another great agent equally favourable as light to the production of vital phenomena. At the region of the poles, where the severest perpetual winter rages, nor plant nor animal is believed to exist; the whole region is dreary, silent, death-like. The coldness of the autumn and winter, even in our own temperate clime, exerts a like deadly influence

on myriads of animals whose germs have been wakened into existence by the increasing heat of spring, and by summer fostered to maturity. Of these in one season some undergo many metamorphoses; give rise to many generations, and seem as it were in so short a period to have lived out ages of existence. Others again die at the setting of the same sun whose morning rays had warmed them into life.

Between the cold and warm blooded are placed, as an intermediate link in the chain, the class of hybernating animals, which pass the winter in a state of stupor resembling sleep. These, as, for instance, the marmot and the bat, possess in summer nearly as high a temperature as any of the warm-blooded class, and live and enjoy life as the happiest of earth's creatures. Their temperature declines with that of the season, and in winter we find them a torpid mass, scarcely manifesting the faintest signs of life, from which they are again only thawed into existence, as it were, by the increasing heat of spring. This phenomenon may be produced at will. Immerse a hybernating animal, buoyant and radiant in the heat of summer, in a mixture of salt and ice, and you make it inanimate almost as a block of marble. In this state life is a game that is slowly played—there is little wasting of the vital powers, and the animal will continue to live a long period without food or drink. Expose it again to the influence of the sun's heat—its energies are reawakened, and it will soon cease to exist if not supplied with nourishment.

In man and other warm blooded animals, the system is protected in a measure against the adverse influence of cold, by their being endowed with capacious organs of respiration,

which serve, by means of oxygen taken into the blood, as a perpetual laboratory of caloric, and from which they are warmed as it were by an internal fire. But even these are unable long to support themselves against the rigours of winter without other means of protection. Nor has this necessity been overlooked by the omniscient Architect of Creation.

Hence the instinct, which prompts the migrations of the feathered tribes to milder regions, the thickening of the fur or other coverings of the skin, in those not gifted with wings, and the intellectual contrivances of man for comfort and self-preservation.

Without air no living things could exist; whether they live by its action on the surface of the body like insects and worms, or inspire it by the means of gills and lungs as it is found admixed in running water, or in the state in which it surrounds the earth. Besides the oxygen with which it supplies the lungs, air exercises other important influences. As it comes in contact with the body, it carries off the useless fluids by evaporation, and when moving in free currents, as in the country, it causes the chest to dilate freely, and imparts to the whole system a cordial and vivifying influence. Hence may be seen the importance of pure air and free ventilation under all the circumstances of life.

Water itself is by no means an unimportant agent in the support of animal life. It forms at least five sixths of the whole mass of every living being, and no vital action can take place in any organ unless copiously supplied with this fluid. It contains, as it runs from the fountain, and especially

as it flows in our streams, a great deal of matter in solution, which serves as the chief source of nutriment to thousands of the most inferior beings. The higher classes of animals, and even man himself, would, for a much longer period than is generally supposed, endure the privation of food, if copiously supplied with this crystal fluid. Of all external things that surround us, these four agents exercise the strongest influence over vital action. They enable the organs of the body to act, or rather stimulate them into action, and that action is life. Their influence is much more considerable than the public is generally apprised of, acting incessantly as they do, from the opening dawn of childhood to the farthest verge of human life. Incalculably useful as they are, yet there are times and seasons in the varying states of human existence when their influence would be excessive, when the light of day would be painful, when "heat would excite unwonted fever in the blood," or "when the winds of heaven might visit us too roughly." To guard against such excesses, and to graduate the use of these elements to that degree most conducive to the vital activity and strength of the body, has ever been a cherished object with many, and for which, in the progressive cultivation and refinement of our race, man has invented means of protection, which, though often warped by indolence of habit and love of luxurious ease, have in the main given to civilised society so much the advantage in regard to health, comfort, and longevity, over savage life.

These elements are all connected with the dead body as with the living; but in the former state they tend only to

corruption and decomposition. What then are the internal machinery, the vital acts on the part of the system, which build up the body and enable it to continue its manifestations of life? The means will be found in the processes of digestion and nutrition, by which the system is incessantly constituted anew; and though the individual as a unit gradually tends towards old age, yet the active particles of his organs are kept, as it were, in a state of perpetual youth. This then forms a simple picture of life; exhaustion from vital action, and restoration by nutrition. A mere question, as it would appear, of loss and gain.

Lord Bacon has not inaptly compared life to a torch, incessantly consuming by the elements which surround it, and that there must a period arrive when even the most enduring being shall find a close. Such in fact is the exhausting nature of vital action, that the exertion of a single day wastes the powers of the body, and renders necessary the daily recurrence of sleep, in which state is passed about one third of the whole period of human existence. It would therefore at first sight appear, that the duration of life ought to be in exact proportion to the sluggishness with which the vital actions are performed. This, in the abstract, and when applied to life in its simplest form, is precisely true. Witness the annual plant; the same season that it springs from the seed, it spreads its branches in full maturity to the breeze, and with its fullest powers of life bears fruit and dies. With it, life is a rapid flame and soon exhausted. Contrast with this the hardy oak; slow in its development, it reaches maturity only after the lapse of years, and when it has acquired a

durability which enables it to last for ages. In the animal kingdom we are presented with similar results. Go view the chrysalis from which the butterfly springs—week after week does it remain in a negative state of existence, that we can scarcely call life; in this state it receives no sustenance from without, and is only enabled to exist so long, in consequence of the feeble action of its organs exhausting so little of its powers of life. But when ripened into a more perfect state of existence, as we see it in the queen butterfly of the meadow, dissipating from flower to flower, how transitory its existence! It dies ere many suns have gone down on its enjoyments. So rapid is the vital exhaustion, that many of this class, even in twenty hours from the period of their development, grow old and die. In such there is no time for reparation by aliment and sleep, and hence thousands of such beings are unprovided even with a mouth. So far, life appears but a simple problem; the vital actions tending to exhaust and shorten it—sleep and nutrition to restore it; and it would seem to be in the power of man to lengthen or shorten existence at will, by graduating the losses of life to the gain by nutrition; that is, by living in a sedentary, inactive state, and thus letting out to the greatest profit the stock of vital power. This method, which is very generally suited to the languid, the weak, the incurable, and the convalescent, is so far from being applicable to man in his natural and healthy state, that there is not a single instance on record, of an habitual sluggard having attained to great longevity. Happily for man, and the high duties he is called upon to discharge, there is something more than the mere question of loss and gain to

be taken into the computation ; that power inherent to living organs and familiar to us all, by which the very exercise and fatigue of the body, if not carried to excess, increase its capability for exertion, and become conducive to long life; so admirable is the structure of the human frame, so much superior to any thing of human contrivance !

“ Vigour from toil, from trouble patience grows.

The weakly blossom, warm in summer bower,
Some tints of transient beauty may disclose ;

But soon it withers in the chilling hour.

Mark yonder oaks,—superior to the power

Of all the warring winds of heaven they rise,
And from the stormy promontory tower,

And toss their giant arms amid the skies,
While each assailing blast increase of strength supplies.”

To enable us to comprehend how a machine so complicated as the human frame, so incessantly in action, should be capable of lasting on not unfrequently for a hundred years, it is necessary to know something of its structure.

A traveller, whose wanderings have for the first time brought some interesting landscape into view, finds his minuter study of it facilitated, by first noting from some hill top the bearing of the streams and undulations of the soil ; so may we find it advantageous, to take a general glance at the position in which man is placed in relation to the rest of animated beings ; to observe the manifold phenomena which his own system develops, and see if it *were* possible, endowed as he has been, that he could have been formed of a less number of parts, or of a frame less delicate, complicated and

expensive; and if there be not also much in such a study which should warm the heart and interest the mind. Indeed in all ages of the world, the composition of their own systems has ever excited the admiration of the wisest men; and Fletcher, an old English poet, has not thought it unworthy of being celebrated in a long didactic poem, under the title of the "Purple Island."

Let us, for the occasion consider man as thrown suddenly upon this theatre of action, armed, like Minerva at her birth, with the full possession of all his faculties, and see to what exciting, what exhausting, and what complicated actions, the little citadel of his frame is exposed. The earth which should yield him fruits is stubborn and needs constant cultivation; beasts are hostile around him and require subjugation,—there are a thousand causes which may suddenly destroy him; the toils of commerce and the excitement of literary pursuits perplex and exhaust him; and there will be required on his part such a state of constant activity and watchfulness, that the mind must soon become fatigued and the body weakened. There must therefore be some means of counteracting the fatal results, to which such exhausting actions must necessarily tend. He will require rest and repose, food patiently digested, and blood circulated with unceasing industry throughout the numerous channels of his body—for if the distribution of the blood be intermitted but for a single minute he dies. To enable him to fulfil and to sustain so much, God has divided his functions, as it were, into two separate modes or forms of life—the life of the intellect and the senses, which raise him almost to the level of an

angel,—and that of the plant, which sinks him even lower than the brute. The former, which puts him in relation with the world around him, is placed under the control of the brain, in which is located the thinking immaterial essence of the mind. From this seat in the brain the mind looks out through the eye—a sort of reflecting telescope, in which it sees mirrored, all that pleases or repels in creation; gains, through the portals of the ear, a knowledge of sounds and things invisible; and obtains, through the senses of smell and taste and touch, a consciousness of the odours, tastes, and exterior qualities of bodies, which are wholly inappreciable to the other senses. Upon the impressions derived through these agents, the mind forms its conclusions,—lends itself to the exhausting processes of thought, or throws the body into motion, to advance or recede as objects are attractive or repulsive. This it accomplishes by aid of the bony levers of the limbs, the muscles which are gracefully and symmetrically wreathed around them, and the nerves which the brain sends to the muscles, and along which like the wires of an automaton the impulses of the will are transmitted. Here is a circle of operations, occupying thoroughly the whole of the intellectual and conscious powers of man, and from which his attention could not be diverted, to take charge of the more mechanical processes, by which the food is elaborated and the blood moved. Nor would it have been wisdom to have placed the actions of the heart, the lungs or the stomach, wholly under the voluntary control of man; else he would in some of those paroxysms of gloom and despondency with which life is chequered, put a stop to their action, as he

closes his eyes against an ungrateful spectacle, or the first occurrence of sleep would have been the sleep of death. For the performance of these grosser functions, the system is provided with another or interior form of life, which is devoid of all ordinary sensation, like that of a plant, and is called the vegetable or organic. In this all the operations are conducted without cessation, silent and unseen, and many without even the consciousness of man. The first and most important of these actions are those of alimentation and digestion, to the regular performance of which man is strongly incited by the gratification arising from the satisfaction of the senses of hunger and thirst,—and from the varied and ample store of aliment spread before him, from which the most fastidious or coarsest appetite is enabled to cater at will. For this purpose the plant draws up from the soil, and converts to its own succulent nature, the crude materials of the earth—for a like object, the animal which browses upon the plant, changes it by the miracles of his digestive powers, into food of a more stimulating and nutritious kind, and which, when distilled through the alembics of man's own organs, is made to constitute a part of his body, whether it be brain or bone or muscle.—Where is there, even in the wildest dreams of the alchemist, any transmutation so strange as this? Whatever may have been the nature of our food, if properly prepared by culinary art, it is converted by the digestive organs into a creamy fluid called chyle, which, with the exception of colour, has nearly all the qualities of blood. This fluid is imbibed by a system of vessels and transmitted finally to the lungs, where its impurities are thrown off by

exhalation, and it is converted into blood. The blood, which is rich with all the elements of nutrition and growth, must now be put in contact with every atom of the body. For this purpose is provided the heart—a forcing pump of matchless contrivance, into which the blood is returned from the lungs, and which drives that fluid with extraordinary force, through a system of arterial tubes, which branch so minutely, that every portion of the whole frame becomes thoroughly irrigated, like the gardens of Egypt by the artificial rivulets of the Nile. The organs thus saturated with blood, appropriate to themselves portions of this floating mass, and are nourished from it, like the radicles of a plant by the fluids which pervade the moistened surface of the earth. That nothing may be lost—for nature in all her operations gives us lessons of the most rigid economy—the unappropriated blood which has been deteriorated in the organs, by giving out its heat to support a uniform temperature of the body, is brought back to the heart by the veins, and is again passed through and purified in the lungs, and fitted for distribution anew.—The new particles of blood which have been deposited in the organs, are vitalised, and assist now in the production of all the acts of life.—This property, however, they possess but for a very limited period, are soon worn out, and must be removed to make place for new.

To accomplish this purpose, another system of vessels is required, called the absorbents, which are universally distributed about the body, with a mouth open, as it were, opposite every particle, ready to receive, and to cast it off, when its vitality has been thus exhausted.

In this way does this interior life, these organs of nutrition, build up and support, by incessant labour, not only their own structure, but that of the senses, the nerves and the brain—the seat of all the faculties that give value to human existence. On the other hand, the intellectual faculties reciprocate this care by their general supervision of the common temple in which they all dwell, guarding it against the inclemencies of the season, moving it from place to place, and supplying it with the fittest aliment for its wants. This difference is observable among others, between reasoning man, and the instinctive brute. In the brute, the life of relation or of the brain and senses is limited in its powers, and almost wholly subordinate to the grosser acts of nutrition. In man the life of vegetation or nutrition is but a means by which the brain and its senses shall be built up and supported as a mansion, in which the mind—the soul of man, may dwell ! Incomprehensive of the future, the brute lives but for the present ; his highest aspirations are but the promptings of his appetite and instinct.

“ The lamb thy riot dooms to bleed to-day,
 Had he thy reason, would he skip and play ?—
 Pleased to the last, he crops his flowery food,
 And licks the hand just raised to shed his blood.”

The human frame, when narrowly examined, is found to be constructed of a multitude of separate organs, associated together like so many individuals, in one well governed community, each one lending its influence to promote the actions of the rest, assisted itself again in return, and all working to effect the common good. There is no jarring in

the action of these different organs in health ; but a beautiful sympathetic concordance reigns throughout the whole, which constitutes a physiological study of much importance to every man, but especially so to the physician. He measures in health the force and frequency of the pulse, the temperature of the body, the depth and frequency of the respiration, the various changes of expression in the face, and the protean manifestations of the mind. So that, when deranged by accident or disease, the very sufferings of the organs are spoken forth so intelligibly to the well instructed physician—in the expressive language of sickness, fever, pain, languor and oppression, as to enable him to determine as readily the hidden seat of the disorder, as the practised engineer can tell, by the altered sound and motion of his engine, what spring or what wheel work is out of repair. This insight which the physician obtains into the condition of the suffering organs of the body, and the truth and certainty with which they reply to his interrogations, unfortunately, cannot be comprehended by those, who are wholly unacquainted with the complicated machinery of the human frame. This is the reason, that his admonitions are so often disregarded, however skilfully he may have been instructed, or however much the frost of time may attest upon his temples the maturity of his experience. But this must soon be altered—is now changing—the very growth of institutions like this, where the man of wealth and leisure abandons the sluggish comforts of his fireside ; and the intelligent mechanic, the labours of the day past by, come to gather from my learned colleagues, in this place, the fruits of wisdom and experience.

When the structure of the human frame, and its multiplied and wonderful phenomena, become, as they soon must, a branch of popular education, the intelligent patient would be no more likely to trust his vital interests to the specious promises of the empiric, than to place his watch for correction in the hands of one who had never looked at its interior structure.

In his healthy and perfect state, in the full meridian of his usefulness and vigour, "What a piece of work is a man!—how noble in reason! how infinite in faculties! in form and moving how express and admirable! in action, how like an angel! in comprehension, how like a god! the beauty of the world! the paragon of animals."

The common means, for the attainment of health and longevity, as the sort of diet, the mode of dress, the general regimen, and the abundant exercise necessary to effect it, if not generally employed, are at least familiar to all.

But it is of the *principles* upon which they act, of the *art* by which these means should be employed in the prolongation of life, that it is the more important to dwell.

From what has been already observed, it must be obvious that life consists but in an assemblage of the actions of the different organs of the body; and that the ultimate limit to which it may be stretched can scarcely be told, as its duration is placed in a considerable degree within man's own disposal. Old age therefore is but a relative term, and must occur in some individuals sooner than in others, in proportion to the strength or weakness of their constitutions, whether that strength or weakness be hereditary or acquired. Some

individuals however even under the most unfavourable circumstances, despite the pinchings of poverty, or the weakening effects of dissipation, attain to very advanced age. Such accidents of longevity are however but exceptions to the general rule, and are evidence not of the harmlessness of such habits of life, but of the natural iron firmness of constitution, which those individuals have possessed. Sometimes even long life appears to be hereditary in particular families and in particular classes of men. This appears to be the case with the Lithuanian Jews, the poorest, the most abject, the most squalid, and yet, on the aggregate, the longest lived of all the inhabitants of Europe, if not of the world. The explanation of this fact is in a great measure to be found in the very circumstances of the poverty and exposure to which they have been long subjected, that for centuries past have cut off early such as are born weakly and infirm, and who, under the fostering care and the comforts of civilised communities, would much more frequently grow up to manhood. These exceptions, therefore, are rather in support than otherwise of the advantage of applying the rules of science in building up the system strongly in youth, and hardening it by judicious exposure in maturer age. In childhood the texture of the body is flaccid and weak, and the vital actions are deficient in that strength and elasticity of play, which time and health only can supply. In the infant the heart beats about one hundred and forty times in a minute—feebly—but frequently—but as the system gains strength, all the organs become less easily excited, the pulsations are reduced in number but increased in force, till

they become in old age about sixty in the same space of time. All the other functions of the body are likewise performed more weakly but more rapidly in children than in adults. This is especially the case in regard to the powers of the brain, the texture of which is soft and pulpy till the sixth or seventh year of life, readily receiving impressions, but which it is unable to retain. All attempts therefore to impress upon the minds of children, knowledge, either in kind or amount, surpassing the feeble powers of their brain, gives a degree of weakness and fickleness to that organ very detrimental in after life. Indeed, such is the amount of experience on this subject, that all unusual natural or acquired precocity of intellect, may be properly looked on as a disease, tending to produce a premature decay of the mental powers and an early grave. The whole history of development, both in the animal and vegetable kingdoms, shows that the longer an individual is in coming to maturity, the greater is the strength of the organs, when matured, and the chances of a long life. In children, therefore, measures should be pursued to diminish their excessive vital sensibility, to spread it out as it were over a greater surface, and thus enable them to take a longer lease of existence. This may be effected by a bland and nutritious diet, by scrupulous cleanliness, and by a free but judicious exposure to light, heat, and air; not however for any great length of time to the intense heat of a summer's sun, nor to the influence of excessive cold. Both these extremes have a tendency to shorten life, as is shown by the short duration of existence in the inhabitants both of the torrid and the frigid zones. In the one, the organs are chilled and benumbed in their action; and in the other,

exhausted by over stimulation. Thus carefully should youth be trained

“From childhood’s promising estate,
Up to performing manhood.”

The rules by which life should subsequently be conducted are already more than half told. Two leading objects are still to be held in view;—to graduate judiciously the exercise of the different organs of the body—not exhausting them when weak—nor over stimulating them when strong,—and by the pursuance of such measures as will harden and invigorate them.

Thus, in regard to the action of the digestive organs, the first and most important of the animal functions, that which acts as the manufacturer of the constituents of the body, no absolute or precise sumptuary regulations can be laid down, as exactly applicable to different individuals. The aliment may be too rich and too exciting, even when it does not lead immediately to disease. This is the case usually with victuallers, who commonly eat largely of fresh meat, several times a day, and, though enjoying the highest state of health, do not on the average attain the longest lives. They wear out the excitability of their organs, and though they are even less prone than others to fall into disease, bring on too rapidly the approaches of old age. Nor yet is the frugal vegetable fare of the anchorite (which is attended in him with a life of little mental or bodily excitement, a mere protracted vegetation) that which is in general the best calculated to produce longevity. The organic machinery of the body is not

sufficiently excited by such a regimen to produce that warm, genial and healthy glow of action, which we have described as pervading the frame. In different individuals the food should be graduated according to the condition of their digestive organs—sometimes gently stimulating, sometimes unexciting and bland ; a fact which the ultra philanthropist, in the advocacy of the exclusive doctrines of temperance, not unfrequently overlooks. Yet the bounds of moderation and sobriety can in no instance, without more or less injury to the system, be surpassed.

The exposure of the body to the action of the common elements, and especially to that of cold air, requires also the same judicious graduation to the strength of the system ; for there are certain states of the constitution when the influence of cold could not fail to be injurious, and when light itself might become the source of disease. Much however may be accomplished in gradually and systematically hardening and fortifying the frame, by its habitual exposure to cold, and by active exercise in the open air. An useful lesson, characteristic of his hardihood of mind and body, is seen in the example of Sir W. Scott, who cured himself of a sore throat, habitually recurring on every slight exposure, by frequently laving it with the coldest water. But to the infirm and delicate, such a course suddenly adopted, would have been fraught with danger. The effect of systematic and active exercise of the body, in strengthening and developing the muscular system, is generally well appreciated. It may be seen in the arm of the blacksmith, and is strikingly exemplified in the fable of Milo and the ox. Hence the reason that

induced the ancient Greeks, in the true spirit of philosophy, to establish gymnastic games, and to encourage, by the bestowal of prizes and rewards upon the victors, every species of exercise calculated to strengthen the body and to lengthen life. The same rules are especially applicable in regard to the intellectual faculties. An active exercise of these organs, proportioned to their strength, and properly varied with intervals of relaxation, is infinitely more conducive to long life, than a state of sluggish mental inactivity or idiotic weakness. The sages of antiquity, who taught their profound philosophy in groves and gardens, and were not ashamed to dispute for physical rewards with the athletes, attained very generally great longevity, and many passed over their hundredth year. The German literati, the most patient, if not the most ardent students in the world, have been frequently remarked for the length of life to which they generally attain. But if the labour be not properly proportioned to the strength of the mental faculties, there is no organ in the body more apt than the brain, in consequence of its high functions, to produce, when overtasked, greater exhaustion of the body, and derangement of the health. There are many instances on record, of men deeply ambitious of literary or scientific distinction, who have attempted tasks beyond the capacity of their mental organs, and have led a life of wretchedness, and found in consequence an early grave. To force the mind "*invita Minerva*," into long and laborious investigations, is far more exhausting and injurious, than when such pursuits have natural attractions for it. This is a subject which in many cases is not taken deeply

enough by parents into consideration, when selecting for a child, as an avocation for life, one of those professions which have been called learned.

The proper cultivation and exercise of the moral faculties, not only as a means of rendering man more useful and happy, but as a mode of lengthening life, is another infinitely more important consideration, than is generally believed. There are no vital actions, which are more thoroughly influenced by a course of education, whether for good or evil, and none which man is more influenced to constrain by all the laws which regulate his own personal interests, or those which influence the community, than the *passions* or moral faculties of the mind. They are not so generally as the intellectual phenomena, immediately and involuntarily excited by the external senses; they are much exaggerated and often produced, by impressions arising from the internal organs, as the heart and stomach. We have previously endeavoured to show, that no organ of the body is capable of acting upon another, without a susceptibility in itself of being reacted on in its turn. This is called sympathy, and in its healthy and perfect state constitutes the great beauty and superiority of the human system, and which, of all its properties, best enables it to withstand the wear of time. This is the great secret of connection between the mind and body—between the brain and the digestive organs. This is the cause, why inflaming drinks, even when not carried to inebriety, rouse up the passions to deeds of violence and murder. This is the frequent cause of the diseases of the heart and digestive organs, most abundant in large communities, where man in

his mental struggles after wealth and fame, is brought most into conflict with his fellow. The very affectation of these passions, is attended with disastrous consequences. Moliere* may be said to have died upon the stage, in the exhibition of unreal, though deep felt emotion.

The depressing passions as, fear, envy, jealousy, chagrin, work likewise their peculiar train of evils; they retard the circulation of the blood, jaundice the skin, impair digestion, and tend to hypochondriasm. Hence the origin of the allegory, by which they have been compared to devouring

* Moliere cannot strictly be said to have died upon the stage. He fell in a convulsion, whilst performing his part in the "*Malade Imaginaire*," but did not expire till after he had been transported to his own residence, as will be seen in the following extract from his life, taken from the "*Biographie Universelle*." The poetic license usually allowed to productions like this may, however, be considered as justifying the assertion in the text.

"Le jour de la quatrième représentation du *Malade Imaginaire*, Moliere souffrait de la poitrine plus qu'à l'ordinaire. On voulut lui persuader de ne pas jouer—*Eh! que feront, dit-il, tant de pauvres ouvriers qui n'ont que leur journée pour vivre? Je me reprocherais d'avoir négligé de leur donner du pain un seul jour, le pouvant faire absolument.* Il joua; et, dans le divertissement de la pièce, au moment où il prononçait le mot *Juro*, il lui prit une convulsion, qu'il essaya vainement de cacher sous un ris forcé. On le transporta chez lui. Deux de ces religieuses qui venaient quêter à Paris pendant le carême, étaient alors dans sa maison, où il leur avait donné un asile. Ces charitables filles lui prodiguèrent inutilement les soins les plus empressés; il mourut bientôt, étouffé par le sang, qui sortait de sa bouche en abondance."

monsters. There are however other moral faculties, which from their benignant mental as well as physical influences we can scarcely cultivate too far. Hope, candour, benevolence, and all such as tend to produce calmness, gaiety, and serenity of mind—these are the real panaceas of life, which beautify and prolong it, and open cheering vistas at its close.

The effects resulting in one instance from the uncontrolled indulgence of passion, and from its philosophical restraint in another, partly no doubt owing to temperament, and partly to moral training, are seen in the contrast presented in the history of two learned men who both lost suddenly, by the conflagration of their manuscripts, the fruits of many years' laborious study. One, *Urceus Codrus*, a name which is now almost forgotten, furious at his loss, fled from society, and gave in solitude such unbridled indulgence to his rage and mortification, that in a short period his paroxysms of passion were converted into permanent insanity. The philosophical forbearance, and the mildly sorrowing exclamation of the other, Sir Isaac Newton, to his dog, the unwary author of the mischief, is familiar to us all as a youthful lesson. He applied himself anew to his calculations, attained to a very advanced and happy old age, and the loss which he more than remedied, is now recorded only as a memento of the moral triumph which he achieved.

Hence it will be seen that there is some philosophy to be practised not in the library alone, but even under the ordinary circumstances of life; that there are means to be pursued, which will give vigour and endurance to the frame, and that

there are also limits to the degree to which vital actions can be carried without their producing premature exhaustion and decay.

No error has been productive of more injurious consequences, than the opinion, which is too generally prevalent, that the true value of life depends less upon its length than its intensity. Those who practice upon such a belief, if they outlive their youth, drag out a premature old age, without energy and without enjoyment. Like Icarus, they would overstep the bounds of nature. Byron, who adopted this opinion as the motto of his youth, and died prematurely old at his thirty-seventh year, thus speaks in the last as well as the most sincere of his poetical effusions.

“ My days are in the yellow leaf,
The fruits, the flowers of love are gone ;
The care, the canker, and the grief,
Are mine alone.”

What a contrast does a virtuous, happy, and lengthened old age, present to that of one precipitated by a life of dissipation ! A striking specimen of the latter is found in the life of Tiberius Cæsar, the step-son of Augustus, and master of the greatest empire the world has ever known ; a man of consummate address and unusual strength of mind, who eked out his life, to the greatest possible length compatible with extreme self indulgence, by applying the rules of a spurious philosophy, in the methodical pursuit of vice. Wearied with the constraints and concealments, which he had from policy

adopted while dwelling in Rome, that monarch retired for the last twelve years of his life, to the Island of Capreæ, on which he had built himself twelve palaces of pleasure, with the avowed object of employing all the powers of his mighty empire, in prolonging, to its utmost limit, the life of one cruel and debased old man. By public edict, every one was forbade, under pain of death, from disturbing his tranquillity. See him, in this small but delightful island, begirt with rocks so as to be accessible only at a single closely guarded point, in a climate rendered delicious from its protection by mountains against the northern blasts of winter, and in summer tempered by the coolness of western winds; looking out in the bay of Naples upon the fairest prospect in the world, and revelling in every sort of indulgence, that an inexhaustible exchequer and a servile nation could heap at his feet; establishing an officer of the highest grade, as the mere intendant of his pleasures, and bestowing honours and emoluments with a lavish hand, upon those who drained the deepest draught from the wine cup, or excelled in other species of debauchery. What a paradise, in his own estimation, had Tiberius here established for himself. Yet what a striking, social and moral lesson, does the result of the life of that wretched old man teach! Steeped in vice, where none but the vicious could behold him; all the administration of affairs neglected; spending days and nights consecutively at his table; every native evil passion tenfold aggravated by its indulgence, and meanly slaughtering, through the agency of a servile senate, the best and bravest of the citizens of

Rome. Cruel, crafty, capricious, revengeful, and mean spirited, "hated of all, and hating"—the incarnation of every evil passion, the executioner of the greater part of his own family; bent in person, and deformed in feature; there was not, when life was ebbing, one of all the myriads he commanded, to whom he durst confide the secret of his approaching dissolution. Conscious himself of its proximity he yet strove to hide it, under sumptuous feasts and affected revels; lifting to his lips untasted, the rich wine and the luxurious viands, till at length he sunk down exhausted in his banqueting hall, and was there smothered by the creatures he had most favoured, for fear that he should again revive.

Contrast this life of splendid crime, with that of good old Cornaro, a noble Venetian, who reformed, with philosophical fortitude at the age of 40, a life of passion and dissipation, which had nearly brought him to the tomb. From that time forward, this excellent man graduated the amount of his food, his wine, his exercise, his amusements and his studies, so exactly within the bounds of temperance and moderation, as to have been enabled to preserve, much beyond the usual term of life, the freshness of youth, with the vigour of middle age. Between the ages of 90 and 100, he wrote two excellent treatises, in which the amiable garrulity of old age is mingled with the wisdom of the sage, and the benevolence of a christian. He lived past his 104th year, enjoying life richly to the last, and died in his elbow-chair, without pain or agony, like one who falls asleep, surrounded by a devoted family, by admiring friends, and in the midst of a

region, which his skill had fertilised, and his kindness peopled with an admiring peasantry. To whom would not such a life be attractive—thus rationally prolonged, and deeply respected, enabling him to enjoy to its utmost limit, as the writings of Cornaro indicate to have been his case,

“All the boundless store
Of charms, which nature to her votary yields;
The warbling woodland, the resounding shore,
The pomp of groves, and garniture of fields;
All that the genial ray of morning gilds,
And all that echoes to the song of even,
All that the mountain’s sheltering bosom shields,
And all the dread magnificence of heaven.”

But we need not go to olden times, nor to a foreign region, for models of excellent and philosophic old age! Our own city may supply them. One now but lately lost, and lamented—not only by the religious persuasion of which he was the head, but by a circle so wide that its limits have not been told; a pattern of christian purity and moral worth. His earthly close was like that of a setting summer sun, whose beams having all day brightened, beautified the earth, and solaced the path of the way-farer upon it, fade at last solemnly and insensibly into the mellow light of even, and leave at their departure a lingering tinge of brightness on the sky—a halo, commemorative of expiring day, and prophetic of the glory of the future morn.

There is another instance of one yet dwelling among us,

known almost universally, and esteemed wherever known, the living Man of Ross, the Cornaro of Philadelphia, whose hours of business are employed in the ministration of all that is kind, courteous and liberal ; and whose periods of leisure are spent in the society of the learned, and the haunts of the philosopher—a living link between the gathered harvest of departed worth, and the rising plants of future promise. May his life be so protracted, and his old age continued so happy, as to be commended for future example, equally with that of the noble Venetian !

Judging from the history of the remotest period, in which the computation of time can be relied on, down to the present moment, a period of three thousand years, there is no reason to believe, that man has in the least either diminished in stature, or life in its duration. In fine, throughout the whole of this period, we find instances of the greatest longevity in modern times. If we examine into the habits of such as have attained, within more recent periods, the greatest length of existence, we shall discover, that they have been, almost without exception, persons of considerable strength of mind, accustomed to much bodily exertion, and who have lived temperate lives. They have been chiefly soldiers and sailors, and agriculturists—scarcely one monarch, and not one voluptuary is found amongst the whole. The individual who is known to have attained the greatest age in modern times, was Thomas Jenkins, who died at Yorkshire, in England, in 1670, 169 years old. The fact of this great age, is indubitably confirmed by the registers of courts, and other tribunals,

in which he had, during a period of forty years, occasionally been sworn in evidence. He was originally a soldier, and followed, during a later period of his life, the business of a fisherman.

Thomas Parr, of Shropshire in England, was a peasant, living a simple and frugal life, and up to the age of 130 was able to support himself by the labour of his hands. When 152 years old, none of his faculties appeared much weakened, except his memory and vision. At that age he died, in consequence, it is supposed, of the luxury and magnificence with which he was treated, when on a visit to London, by order of George III. Among many other modern instances of longevity, is that of a Dane, by the name of Drakenberg, who had been a sailor in his early youth ; spent fifteen years in slavery among the Turks ; and lived to the age of 146. Numberless other instances of great longevity might be adduced, in our own climate, as well as that of Europe, and even among the slave population of the southern states. But these will suffice, to show the length of period, to which, under certain circumstances, human life may be protracted.

In different individuals, the limits of existence must necessarily vary, not only in proportion to their natural strength of constitution, but also as to the manner in which the vessel of life has been exposed on its voyage, to storm, and gale, and wreck ; to rust and rottenness from neglect in the sluggish harbour ; properly freighted, and judiciously governed, or strained and torn by press of sail ; and especially in regard to the preservation of that state of equilibrium of the mental,

and bodily functions, which Goethe so carefully cultivated, and which enabled him to live so long, so usefully, and so happy. But were individuals circumstanced most favourably in these respects, we might be almost justified, in considering that man, as dying untimely, who closed his course much below his hundredth year. The pursuit of health, and longevity, has in all ages engrossed the aspirations of the human race. When not sought for, in accordance with the dictates of physiological science, it has given rise to many of the wildest schemes for its attainment. It has led to the employ of amulets, auriferous tinctures, vital elixirs, and animal magnetism. But there is no magical, no luxurious, no royal road to their acquisition. They are to be obtained only by a life of some self denial, of temperance and sobriety, even some hardship and exposure; and by the judicious cultivation of the moral and mental faculties, which in their proper state elevate and refine the feelings, and lead insensibly to a proper discharge of the duties of life.

It is, probably, too much to suppose, that with the thousand temptations, with which man is surrounded, such a course will in general be practised, as to lead life out to its greatest limits. In this respect, the prophet's mirror is behind him. But it is well for man to know, that the observance of such measures would richly repay him by the increased comfort and vigour of his declining years. When we observe the wonderfully complicated organisation of the frame of man, the noble domain which is subjected to his control, the vast achievements which his art and genius have accomplished, the passions which degrade and sink

him to the brute, and the intellect which places him but little lower than the angels; what a mixed picture does he present, of light and shade—of beauty and deformity.

How abject, how august, how wonderful, how complicate is man!
How passing wonder, He, who made him such.

THE END.





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